

b) $y = \frac{1}{x} + \cos 2x$, find $\frac{d^5 y}{dx^5}$

$$y = x^{-1} + \cos 2x$$

$$\frac{dy}{dx} = -x^{-2} - 2 \sin 2x$$

$$\frac{d^2 y}{dx^2} = 2x^{-3} - 4 \cos 2x$$

$$\frac{d^3 y}{dx^3} = -6x^{-4} + 8 \sin 2x$$

$$\frac{d^4 y}{dx^4} = 24x^{-5} + 16 \cos 2x$$

$$\frac{d^5 y}{dx^5} = -120x^{-6} - 32 \sin 2x$$

c) $y = \ln(\operatorname{cosec} x - \cot x)$

$$\frac{dy}{dx} = \frac{1}{\operatorname{cosec} x - \cot x} (-\operatorname{cosec} x + \operatorname{cosec}^2 x)$$